



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>7</sup> : A61L 27/18, 29/06, 15/26, C12M 3/00, 3/06, C08J 9/26 // C08L 83:04</p>	A3	<p>(11) International Publication Number: <b>WO 00/24437</b></p> <p>(43) International Publication Date: 4 May 2000 (04.05.00)</p>
<p>(21) International Application Number: PCT/GB99/03558</p> <p>(22) International Filing Date: 28 October 1999 (28.10.99)</p> <p>(30) Priority Data: 9823446.1 28 October 1998 (28.10.98) GB 9912641.9 28 May 1999 (28.05.99) GB</p> <p>(71) Applicant (for all designated States except US): ASHBY SCIENTIFIC LTD. [GB/GB]; Unit 11, Atlas Court, Coalville, Leicestershire LE67 3FL (GB).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): FULLER, Jess, Paul [GB/GB]; 41 Denis Street, Hugglescote, Leicestershire LE67 2FP (GB). PEGG, David [GB/GB]; 10 St. Paul's Square, Holgate, York YO24 4BD (GB). BIRD, Robert, McLean [GB/GB]; 75 Victoria Street, Melbourne, Derbyshire DE17 3FR (GB). CLIFFORD, Timothy, Burgess [GB/GB]; 3 Barkby Road, Queniborough, Leicestershire LE7 3FE (GB). CLAYSON, Tony [GB/GB]; 7 Coalville Lane, Ravenstone, Leicestershire LE67 2LR (GB).</p> <p>(74) Agents: KILLIN, Stephen, James et al.; Venner, Shipley &amp; Co., 20 Little Britain, London EC1A 7DH (GB).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p> <p>(88) Date of publication of the international search report: 19 October 2000 (19.10.00)</p>
<p>(54) Title: TEXTURED AND POROUS SILICONE RUBBER</p> <p>(57) Abstract</p> <p>A method of making a silicone rubber having a structure adapted for growth of cells or living tissue, which comprises contacting a silicone rubber precursor with a biologically-acceptable sacrificial filler, curing the resultant mixture and removing the sacrificial filler to form a structured silicone rubber.</p>		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 99/03558

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61L27/18 A61L29/06 A61L15/26 C12M3/00 C12M3/06  
C08J9/26 //C08L83:04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61L C12M C08G A61F C08J A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 97 08291 A (ASHBY SCIENT LTD ;FULLER JESS PAUL (GB)) 6 March 1997 (1997-03-06)</p> <p>abstract page 1, line 6-9 page 2 -page 5</p> <p>---</p> <p>-/--</p>	<p>1-7,11, 15,16, 25,26, 28-36, 41,43, 44,48, 53,60, 61,63, 66-68</p>

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*&amp;\* document member of the same patent family

Date of the actual completion of the international search

19 July 2000

Date of mailing of the international search report

21 07. 2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl  
Fax: (+31-70) 340-3016

Authorized officer

Böhm, I

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/03558

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WO 97 15242 A (SEARE WILLIAM J JR) 1 May 1997 (1997-05-01)</p> <p>page 3, line 8-20 page 5, line 12-14 page 9, line 23-35 page 10, line 1-11 page 12, line 33-36 page 13, line 27-29 page 16, line 21-24 page 17, line 15-18 page 19, line 17-23</p>	<p>1-7,11, 15,16, 20,21, 24-27, 34-39, 41, 43-51, 53, 60-63, 66, 70-75, 78-81, 83-90, 92-104, 106-121, 123-127, 138-141, 143-145, 150-159</p>
Y	<p>WO 97 21347 A (AVECOR CARDIOVASCULAR INC) 19 June 1997 (1997-06-19) cited in the application</p> <p>abstract page 3, line 29 -page 4, line 27 page 6, line 5-18 page 7, line 1-19 page 8, line 11-18 page 10, line 6-12</p>	<p>1-7,11, 15,16, 20,21, 24-27, 34-39, 41, 43-51, 53, 60-63, 66, 70-75, 78-81, 83-90, 92-104, 106-121</p>
Y	<p>EP 0 326 278 A (DOW CORNING KK) 2 August 1989 (1989-08-02) page 2, line 3-6,32-36</p>	123-127

-/--

## INTERNATIONAL SEARCH REPORT

International Application No

PCT, 23 99/03558

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 033 355 A (AMUNDSON DAVID CHARLES) 5 July 1977 (1977-07-05) abstract column 2, line 8-17 ---	143-145
Y	EP 0 450 671 A (DUPHAR INT RES) 9 October 1991 (1991-10-09) abstract column 1, line 1-11, 47-51 column 2, line 22, 23 column 4, line 39-44 ---	150-156
Y	US 4 377 077 A (GRANLUND DAVID J) 22 March 1983 (1983-03-22) abstract column 4 -column 5 ---	138-141
Y	EP 0 277 009 A (ACCU MED CORP) 3 August 1988 (1988-08-03) abstract column 1, line 37-63 ---	157-159
A	US 5 614 095 A (DEGEN PETER J ET AL) 25 March 1997 (1997-03-25) abstract column 4, line 3-7 ---	128-137
A	WO 97 03744 A (GEMBOLIS DONALD J ; SHANE BRUCE E (US); PARKER HANNIFIN CORP (US)) 6 February 1997 (1997-02-06) abstract page 3, line 7-20 -----	128-137

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 99/03558

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 40, 42, 64, 77  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 40,42,64,77

The present application fails to comply with the clarity and conciseness requirements of Article 6 PCT (see also Rule 6.2(a) PCT), that claims (see claims 40,42) shall not rely on references to the description or drawings.

Furthermore should additional fees be paid for the search of the corresponding invention(s), the applicant is informed that claims 64 and 77 are not searchable because they don't comply with the requirement of Article 6 PCT (see also Rule 6.3. (a) PCT). The definition of the matter for which protection is sought shall be in terms of the technical features of the invention, that means, the method of culturing biological material shall be described in the claim.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-43

method for making silicone rubber having a structure adapted for growth of cells or living tissue

- silicone rubber obtained
- biomedical device comprising silicone rubber obtained

2. Claims: 44-77

a) claims 44-69

- culture chamber having one gas permeable wall
- a textured interior growth surface
- apparatus comprising several above culture chambers
- method of culturing microbiological material in a culture chamber or apparatus
- method of carrying out a bioprocessing operation

b) claims 70-77

- a well comprising at least one wall having at least one portion gas-permeable and at least a portion of the interior surface of the wall being structured
- microtitre plate having at least one well as above
- method of culturing microbiological material on a well as above

3. Claims: 78-82

implant device comprising cell support structure having a coating with a textured surface

4. Claims: 83-89

substrate for growth of skin grafts in vitro comprising a flexible membrane having a textured surface

- skin graft grown on substrate

5. Claims: 90-122

a) claims 90-100

- tissue support structure comprising a biocompatible material having an internal system of pores
- apparatus for culturing tissue or cellular agglomerates comprising tissue support structure

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

b) claims 101-115

- artificial implant formed from a material having an internal system of pores

c) claims 116-122

- a cell implant means comprising a porous material for retention of cells to be implanted and a protective means to shield the cells from immune attack after implant

6. Claims: 123-127

- drug delivery system comprising a porous material whose pores have been impregnated or saturated with a drug for delivery

7. Claims: 128-137

- a filtration media comprising a porous silicone rubber

8. Claims: 138-142

- a cell cryopreservation system comprising a porous material for absorbing cell culture into the internal system of pores and a container suitable for storage in liquid nitrogen

9. Claims: 143-149

- electrode comprising porous material having electrically conductive particles dispersed therein
- method of treating sewage using electrode system

10. Claims: 150-156

- wound dressing comprising a first layer of a porous gel and a second layer of a carrier gel

11. Claims: 157-161

- clinical swab comprising a porous material

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PL GB 99/03558

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9708291 A	06-03-1997	AU 6828696 A EP 0847441 A GB 2304732 A	19-03-1997 17-06-1998 26-03-1997
WO 9715242 A	01-05-1997	JP 10512176 T	24-11-1998
WO 9721347 A	19-06-1997	US 5686304 A AU 1335497 A EP 0883339 A	11-11-1997 03-07-1997 16-12-1998
EP 0326278 A	02-08-1989	JP 1186823 A	26-07-1989
US 4033355 A	05-07-1977	NONE	
EP 0450671 A	09-10-1991	CA 2037247 A JP 4220258 A US 5219325 A	03-09-1991 11-08-1992 15-06-1993
US 4377077 A	22-03-1983	US 4455842 A	26-06-1984
EP 0277009 A	03-08-1988	AR 240392 A AU 608562 B AU 1098288 A AU 619413 B AU 6019690 A BR 8800382 A CA 1313998 A DK 43288 A FI 880388 A JP 63215939 A MX 167746 B NO 880381 A NZ 223298 A NZ 233825 A	30-04-1990 11-04-1991 04-08-1988 23-01-1992 15-11-1990 20-09-1988 02-03-1993 30-07-1988 30-07-1988 08-09-1988 12-04-1993 01-08-1988 26-10-1990 26-10-1990
US 5614095 A	25-03-1997	US 5435957 A CA 2119483 A CN 1099670 A EP 0645487 A JP 7096153 A	25-07-1995 04-03-1995 08-03-1995 29-03-1995 11-04-1995
WO 9703744 A	06-02-1997	DE 69602268 D DE 69602268 T EP 0840644 A	02-06-1999 12-08-1999 13-05-1998